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Tree to Chips to Red Meat to Steaks, it serves as emergency livestock feed

Les Kamstra

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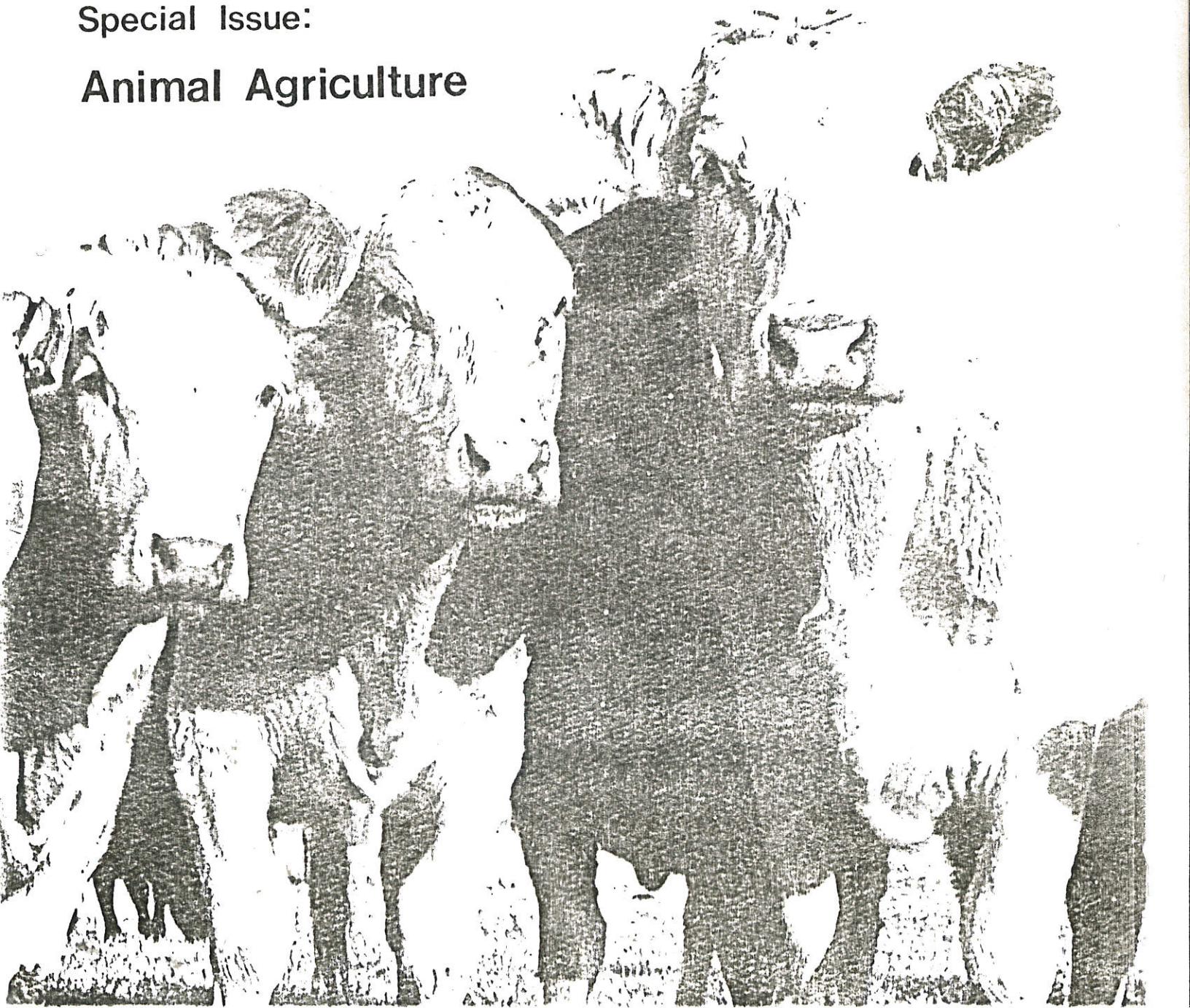


Aspen

Tree to chips to red meat to steaks, it serves as emergency livestock feed

Les Kamstra
Ruminant Nutrition

We must be resourceful. Our "natural" resources are becoming scarcer every day, while waste products mushroom in dumps, along roadsides, in the water and air.

If we are resourceful enough, we can use some of these wastes—crop residues, saw mill wastes, fiber processing wastes, and even standing but uneconomic trees—in other industries.

High feed costs and low cattle prices are severely testing South Dakota's agricultural economy. But researchers, hunting for alternatives in feeding methods as well as in feeds themselves, are beginning to show that certain wastes can themselves become resources.

Waste fiber research is new in South Dakota. It's slow and difficult because even yet, turning a "sow's ear" into a "silken purse" takes time. Oddly enough, these wastes must be available in sufficient and continual amounts for use in sustained feeding programs. The interest shown in this research by no less than two dozen federal, state, and private groups indicates the importance of our fiber research, however.

The most abundant renewable feed on earth

The ruminant animal is one of the ways these wastes can be processed. Mainly, these include beef and dairy cattle and sheep. The ruminant with its multi-unit stomach can use cellulose (roughage fiber) which is the most abundant, naturally renewable feed material on earth. Resident bacteria in the rumen (part of the animal's digestive system) break down these high-cellulose wastes into meat and other animal products.

Better methods of preserving our more valuable roughages is one phase of this research, while finding and using alternative roughage sources is another. This is especially necessary when traditional roughages are in short supply during droughts. Wood wastes potentially are a large source of fiber for ruminant feeds. But inherent nutrient deficiencies must be corrected and natural barriers to animal digestion removed, mainly through economical processing procedures that provide a product competitive with the conventional roughage. A 3-hour chemical treatment developed by SDSU cooperatively with Colorado State is one result of research that makes a highly lignin encrusted fiber such as ponderosa pine in sawdust form readily digestible by ruminants.

Various percentages of ponderosa pine sawdust were successfully used as a roughage for cattle rations in SDSU research several years ago. (At the time sawdust was not in a competitive price position with hay.) Sawdust is a lumber industry byproduct. It takes up space for storage or becomes a smoke pollutant if burned. A single mill in western South Dakota may produce more than 20 tons of waste fiber (sawdust) daily.

SDSU researchers have used ground-up mature aspen wood in a 2-year study with cattle. Whole aspen tree material was used in various feeding experiments ranging from maintenance to finishing rations.

"Calves in good shape"

These preliminary studies with aspen and ponderosa pine indicate these fibers (cellulose) can be used as feeds if properly supplemented or treated. Two hundred stock cows were wintered (1976-77) with aspen based rations and compared to cows on mixed hay in a demonstration on the Robert Healy ranch near Pukwana. Three rations were compared: an aspen:alfalfa (60:40) pellet, an aspen silage (88.5% aspen: 10% corn: 1% limestone: 0.5% urea), and mixed grass hay.

The alfalfa:aspen pellets were easiest to feed. They showed best results and under 1976-77 drought conditions were the most economical.

"I'm satisfied, the calves are in good shape and the pellets were easiest to feed," is how Healy summed it up.

County agent Delmer Moore who helped with the project agreed, adding, "the aspen mixture offers great opportunities but we need more verification research."

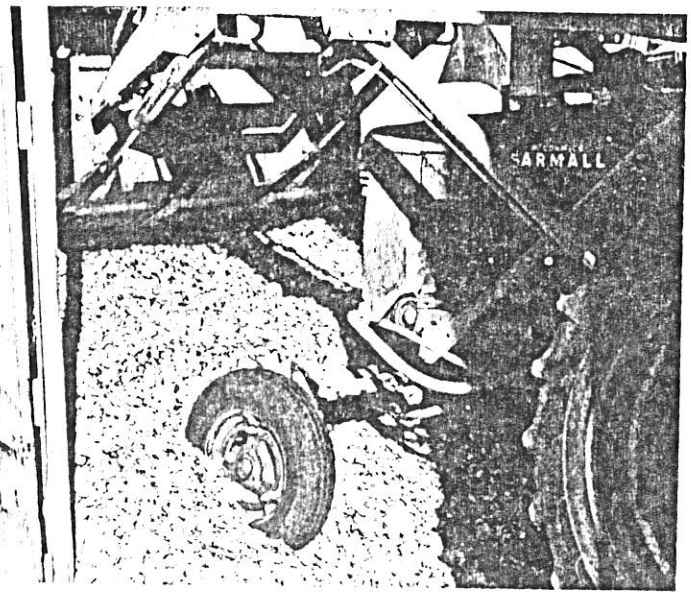
Ranchers from as far as Montana and Nevada, a race horse nutritionist from New Jersey, and several zoos have inquired for additional information relating to using aspen in animal feed.

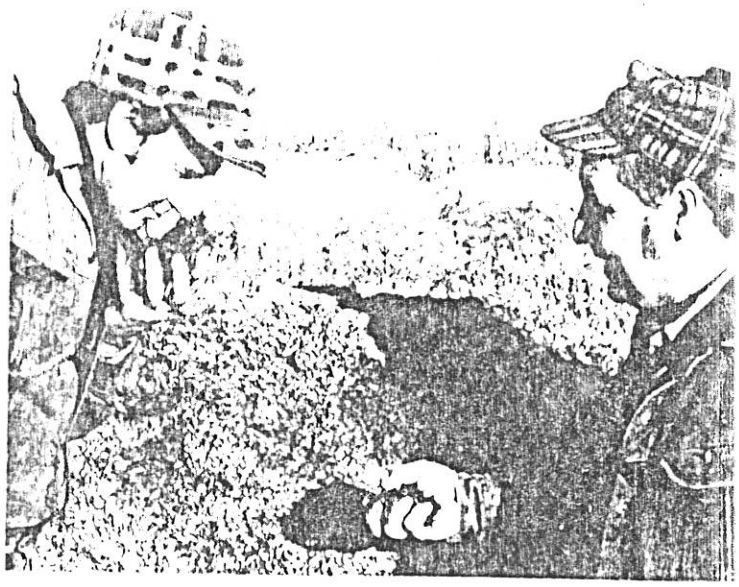
Previous research at Brookings indicated that aspen might have a place as a roughage in growing and finishing rations. For example, average daily gains of 2.68 lbs for a 36% aspen-soy growing ration mix compared with 1.26 lbs daily gain from a comparative 93% alfalfa ration. No researcher maintains that aspen will replace conventional forages, but its potential now is known as a possible ration component in emergency situations.

A harvestable crop

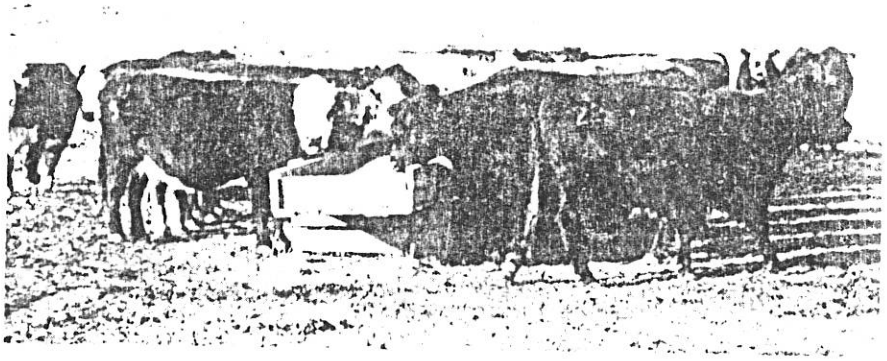
One question is frequently asked: what about the source of aspen. A Forest Service inventory shows that South Dakota has about 28,000 acres of pure aspen stands not being harvested for any commercial use. Other adjoining states have more than 3 million acres of aspen trees for potential harvest for feed or fiber. Aspen is one of the most widespread of trees. Estimates indicate that an acre of mature aspen could produce enough fiber to make up half of a ration for 50 head of cattle for a year.

South Dakota aspen stands are mainly mature trees 60 years old or older and may be lost if not regenerated by harvesting or burning. The South Dakota





Game, Fish, and Parks Department originally contacted the Agricultural Experiment Station waste fiber research project when mature aspen trees were cut in the Black Hills. Regeneration from roots of the trees would provide improved wildlife habitat, especially for ruffed grouse. SDGF&P sought a use for the cut aspen trees in the experiments.



Calling a halt to pine needle abortion

Other Black Hills trees have a far more unpleasant role in ruminant nutrition.

Pine needle abortion results when cows graze the pine needles in foothill pastures. Young are aborted, and infection in the cow results in loss of reproductive potential.

Severe losses have often been reported.

Added facilities of the Animal Science Department are expected to help solve the riddle of pine needle abortion because animals can be contained in quarters suitable for controlled studies.

Thus far, the fractions within the needles possessing the abortive factor have been isolated, and many sub-fractions containing more specific chemicals have also been separated for biological studies with small animals.

At least one major pharmaceutical company is closely monitoring this research.